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TRANSMITTAL OF APPEAL BRIEF (Large Entity)

Docket No.
08CL5989-7

In Re Application Of: Eric Thomas Gehr

Application No. 10/740,074	Filing Date December 17, 2003	Examiner Peter A. Szekely	Customer No. 23413	Group Art Unit 1714	Confirmation No. 1405
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Invention: METHOD FOR REDUCING HAZE IN A FIRE RESISTANT POLYCARBONATE COMPOSITION

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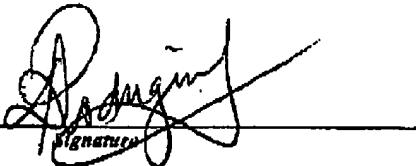
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Applicant(s): Eric Thomas Gehr et al.

Docket No.

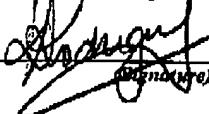
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Eric Thomas Gohr et al.)
Serial No.: 10/740,074) Group Art Unit: 1714
Filed: December 17, 2003)
For: METHOD FOR REDUCING HAZE IN) Examiner: Szekely, Peter A.
A FIRE RESISTANT POLYCARBONATE)
COMPOSITION)

Commissioner for Patents
P.O. Box 1450
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APPEAL BRIEF

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I. REAL PARTY IN INTEREST

The real party in interest in this appeal is the General Electric Company.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences known to Appellants, Appellants' legal representatives, or assignees that will directly affect, be directly affected by, or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF THE CLAIMS

Claims 1 - 29 are pending in the application. Of these, Claims 10 - 20 are allowed. Claims 1 - 9 and 21 - 29 stand finally rejected. Claims 1 - 29, as they currently stand, are set forth in Appendix A. Appellants hereby appeal the final rejection of Claims 1 - 9 and 21 - 29.

IV. STATUS OF THE AMENDMENTS

No amendments have been filed subsequent to the rejection dated November 21, 2005. All prior amendments have been entered.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Polycarbonates are used in a variety of applications from buildings, car exteriors, aircraft interiors, or the like. The use of polycarbonates instead of metals decreases weight, improves sound dampening, and makes manufacturing and assembly of devices easier. Unfortunately, polycarbonates are inherently flammable, and thus use flame retardant additives to prepare a flame-retardant polycarbonate composition. The challenge is to identify economical, environmentally friendly flame retardant additives that provide the requisite flame resistance, but without compromising desirable polycarbonate properties such as strength and clarity.

Polycarbonates have generally been rendered flame retardant by using halogen based flame retardants that contain bromine or chlorine. However, these flame retardants are environmentally unfriendly and generally cannot be used in applications where environmentally friendly products are desired.

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Flame resistance in polycarbonate compositions may also be achieved using a sulfonic acid salt such as potassium perfluorobutane sulfonate (KPFBS). While flame resistant, transparent polycarbonate compositions may be produced using KPFBS, optimum flame resistance is found for levels of salt that can result in haze, especially for thicker samples. The amount of flame retardant that can be added when an optically clear product is desired is thus limited. It is therefore desirable to develop methods where the haze and optical transparency of a flame retardant polycarbonate composition can be controlled. In particular, it is desirable to develop flame retardant polycarbonate compositions where the percent haze is about 0.51 to about 1.23.

It has surprisingly been found that highly flame resistant and transparent polycarbonate compositions may be obtained by blending KPFBS with a first polycarbonate to produce a concentrate, then blending the concentrate with a second polycarbonate to form a transparent, fire resistant polycarbonate composition. The use of KPFBS in a concentrate and a flame retardant composition has already been allowed to the Applicants and is now Patent No. 6,730,720.

In the practice of the process, the KPFBS is blended with a first polycarbonate to form a concentrate that is an intimate blend. The concentrate is further blended with a second polycarbonate to produce a final intimate blend. Such conditions resulting in an intimate blend often include mixing in single or twin-screw type extruders or similar mixing devices that can apply shear to the components. It is often advantageous to apply a vacuum to the melt through at least one or more vent ports in the extruder to remove volatile impurities in the composition.

In a preferred embodiment, the concentrate is pelletized. The first polycarbonate and flame retardant salt blend is extruded in molten form through a strand die to a water bath and pelletizer. The pelletized concentrate is then further blended with a second polycarbonate. The first polycarbonate can be the same as the second polycarbonate.

Not wishing to be bound by any theory, it is believed that the present method of using the KPFBS-polycarbonate concentrate aids in completely dissolving the KPFBS salt into the final polycarbonate composition by giving the KPFBS crystals an additional heat history. The additional heat history may allow for effectively solubilizing greater amounts of salt into the matrix. The present method allows for the use of higher levels of

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flame retardant salt, thereby providing robust flame performance while at the same time maintaining polymer transparency.

While the use of KPFBS in a concentrate and a flame retardant composition has already been allowed to the Applicants and is now Patent No. 6,730,720, the Examiner has contended that other salts from the same family as KPFBS will not produce this same flame retardant effect. The Examiner contends this based on the fact that U.S. Patent No 6,353,046 to Rosenquist et al. has stated that another salt namely potassium diphenylsulfone-3-sulphonate (KSS) did not work as a flame retardant. In this Appeal, the Applicants contend that KSS belongs to a different family of flame retardant salts from KPFBS and that the other salts belonging to the same family as KPFBS can be used in concentrates to produce flame-retardant polycarbonates according to the claimed invention. Declaration A and B (affixed hereto as Appendix B and C respectively) contain data obtained with KPFBS (and were used to obtain Patent No. 6,730,720) and are hereby being submitted as evidence that other salts from the same family as KPFBS will function as flame retardants in polycarbonate when manufactured by the method claimed in the present application.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1 – 9 and 21- 29 stand rejected under 35 U.S.C. § 103(a), as allegedly being unpatentable over U.S. Patent No. 5,449,710 to Umeda et al., (Umeda) in view of U.S. Patent No 6,353,046 to Rosenquist et al. (Rosenquist) or U.S. Patent No. 4,130,530 to Mark et al. (Mark), further in view of U.S. Patent No. 5,663,280 to Ogoe et al. (Ogoe '280) or U.S. Patent No. 5,041,479 to Ogoe (Ogoe '479). (Office Action dated 11/21/2005 page 2)

VII. ARGUMENT

Claims 1 – 9 and 21- 29 are patentable under 35 U.S.C. § 103(a) over Umeda in view of Rosenquist or Mark, further in view of Ogoe '280 or Ogoe '479.

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing a *prima facie* case of obviousness, i.e., that all elements of the invention are disclosed in the prior art; that the prior art relied upon, coupled with knowledge generally

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available in the art at the time of the invention, contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references; and that the proposed modification of the prior art had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996).

In making the rejection, the Examiner has stated that

[i]t would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use siloxanes in the secondary references in the composition of Umeda et al. in order to reduce the melt viscosity and to masterbatch the resulting compositions for better dispersion of the flame retardant salts.

(Office Action dated 11/21/05, page 3) Applicants respectfully disagree with the rejection.

Umeda teaches a flame retardative polycarbonate resin composition which comprises 100 parts by weight of an aromatic polycarbonate resin (A), 0.01 to 0.5 part by weight of an alkali/or alkaline-earth metal salt of a perfluoroalkanesulfonic acid (B), 0.03 to 5 parts by weight of an organopolysiloxane containing organoxysilyl group bonded to a silicon atom through a divalent hydrocarbon group (C), and optionally 5 to 120 parts by weight of an inorganic filler. (see Abstract) The organopolysiloxanes disclosed by Umeda are required to have an organoxysilyl group as shown in formulas VII and VIII (Col. 7, lines 20 – 36).

Umeda teaches that the resin composition can be prepared by compounding components (A), (B) and (C) and kneading the resulting compound. (Col. 11, lines 33 – 38) More specifically, Umeda does not teach first manufacturing a pelletized concentrate that comprises a flame retardant salt and a polycarbonate. For this reason at least, Umeda does not teach all elements of the claimed invention.

Rosenquist teaches manufacturing a fire resistant polycarbonate composition by incorporating into polycarbonate, a fire retardant component containing a perfluoroalkane sulfonate and a cyclic siloxane. (see Abstract) Rosenquist discloses that in order to use

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polycarbonates in many applications, it is necessary to include additives which retard the flammability of the material and/or which reduce dripping. (Col. 1, lines 11 – 14) Rosenquist, like Umeda, does not teach first manufacturing a pelletized concentrate that comprises a flame retardant salt and a polycarbonate. Rosenquist therefore does not make up for the deficiency of Umeda.

Additionally, Rosenquist cannot be combined with Umeda in the manner made by the Examiner. In the first instance, there is no motivation to combine Rosenquist with Umeda since the organopolysiloxanes of Umeda require the presence of an organoxysilyl group, while the cyclic siloxanes disclosed by Rosenquist do not contain such organoxysilyl groups. The exemplary cyclic siloxanes disclosed by Rosenquist in Col. 2, lines 38 – 61 does not contain organoxysilyl groups. Similarly, Rosenquist's examples in Col. 3 through Col. 5, use octaphenylcyclotetrasiloxane as the cyclic siloxane. Octaphenylcyclotetrasiloxane too does not contain an organoxysilyl group. Thus one of ordinary skill in the art upon reading Umeda would not have combined it with Rosenquist in the manner made by the Examiner.

Mark teaches a plasticized polycarbonate composition comprising high molecular weight aromatic carbonate polymer and a minor amount of a cyclic siloxane plasticizer (See Abstract). Mark, like Umeda and Rosenquist, does not teach first manufacturing a pelletized concentrate. Mark therefore does not make up for the deficiencies of Umeda or Rosenquist.

Additionally, Mark does not teach fire retardant compositions that contain flame retardant salts and therefore does not provide any motivation for one of ordinary skill in the art to combine it with Umeda. To the contrary, one of ordinary skill in the art desirous of manufacturing a flame retardant composition would be demotivated from combining Mark with Umeda, since Mark does not even teach or disclose flame retardancy or haze reduction.

Further, since Mark like Rosenquist, does not teach cyclic siloxanes that contain organoxysilyl groups, one of ordinary skill in the art upon reading Umeda would find no motivation to substitute the cyclic siloxanes of Umeda with those disclosed by Mark.

Ogée '280 teaches a carbonate polymer composition comprising a carbonate polymer, a low volatility aromatic phosphate ester compound, and optionally an alkali

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metal salt having a pH of at least 7 (see Abstract). In the first instance, Ogoe '280 does not teach or disclose the use of cyclic siloxanes.

While Ogoe '280 in Col. 18, line 66 does disclose masterbatching (i.e., manufacturing a concentrate), the additive masterbatch disclosed by Ogoe '280 is not the same as the concentrate presently claimed. For example, Ogoe '280 teaches adding a phosphate ester and an alkali metal salt to a carbonate polymer to form the additive masterbatch. (Col. 18, line 66 – Col. 19, line 5) The additive masterbatch together with the UV stabilizer, antioxidant, epoxidized soybean oil are combined with linear polycarbonate and pelletized in an extruder. (Col. 19, lines 6 – 67). Thus, the additive masterbatch disclosed by Ogoe '280 is a granular mixture that has not been blended and pelletized as is presently claimed. After pelletization, Ogoe '280 does not teach or disclose any additional blending. In other words, Ogoe '280 does not teach a "let down" step, i.e., the masterbatch disclosed in Ogoe '280 is not further blended with additional polycarbonate (i.e., the second polycarbonate).

The claimed invention in contrast is directed to first blending the flame retardant salt with polycarbonate to make a pelletized concentrate and subsequently blending the pelletized concentrate with additional polycarbonate (i.e., the second polycarbonate) and a cyclic siloxane to manufacture the fire resistant polycarbonate. Thus, Ogoe '280 too does not teach all elements of the claimed invention. As a result, combining Ogoe '280 with Umeda, Mark and Rosenquist would still not produce the claimed invention.

Further, Ogoe '280 teaches that the objective of its invention is to produce a carbonate polymer having a UL-94 V-2 performance level. (Col. 4, lines 3 – 4) Ogoe '280 further teaches that in order to obtain a UL-94 V-2 rating, the addition of an aromatic phosphate ester compound to the polycarbonate will promote sufficient dripping to remove the burning polymer from the part being tested thereby achieving the desired UL-94 V-2 rating. (Col. 4, lines 54 – 60)

In the first instance, it is submitted that there is no motivation to combine Ogoe '280 with Rosenquist since the teachings of Ogoe '280 are in direct contradiction to those of Rosenquist. As noted earlier, Rosenquist teaches a flame retardant polycarbonate composition, where dripping during a flame retardancy test is to be reduced. Ogoe '280 on the other hand teaches a composition containing an aromatic phosphate ester in an

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amount effective to facilitate dripping during a flame retardancy test. (Col. 4, lines 54 – 60) One of ordinary skill in the art upon reading Rosenquist would not attempt to combine it with Ogoe '280, since the teachings of these respective references are mutually exclusive. The Applicants also contend that the combination of Ogoe '280 with Umeda, Mark and Rosenquist was made in hindsight using the present invention as a template.

Ogoe '479 discloses making a concentrate by pelletizing a carbonate polymer comprising one or more additives selected from the group consisting of a metal salt, a halogenated aromatic compound, a metal salt of an inorganic compound, a free aromatic sulfimide and a fibril forming polytetrafluoroethylene (see Claim 1). The Examples of Ogoe '479 teach manufacturing a concentrate comprising all of the additives and the polycarbonate in a single step. (see Examples 1 – 3 in Col. 3, line 64 to Col. 4, line 50) The concentrate is then let down with only the base polycarbonate resin. Ogoe '479 states that “[t]he improvement of Izod impact via the use of IR concentrate is attributed to more uniform dispersion using IR concentrate than using IR masterbatch”. (Col. 5, lines 32 – 35) The Examiner has cited this as motivation for using a concentrate. (Office Action dated 07/27/04, page 4)

The Applicants would like to direct the Appeal Board's attention to the attached Declaration (attached as Appendix B), which in turn references two earlier declarations – Declaration A and Declaration B submitted in support of the invention in the parent application i.e., U.S. Application Serial No. 09/749,645 filed on December 27, 2000, now U.S. Patent No. 6,730,720. In Declaration A (attached as Appendix C) and Declaration B (attached as Appendix D), a fire resistant polycarbonate comprising polycarbonate, the flame retardant potassium salt of perfluoro butane sulfonate (KPFBS) and a cyclic siloxane was tested for impact resistance as well as for other relevant properties. The fire resistant polycarbonate in the respective Declaration's A and B was manufactured in the manner claimed in the present application. While the fire retardant salt in the Declarations A and B is the potassium salt of perfluoro butane sulfonate (KPFBS), it is submitted that since this salt belongs to the same family as the fire retardant salts claimed in Claim 1 and Claim 21 they would behave in a manner similar to the potassium salt of

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perfluoro butane sulfonate (KPFBS). The attached declaration (Appendix B) attests to this.

In Declaration A, Table 1 shows the impact properties for a fire resistant polycarbonate comprising polycarbonate, potassium salt of perfluorobutane sulfonate and cyclic siloxane. Sample 6 in Table 2 shows impact properties for a polycarbonate that does not contain any flame retardant salt. Similarly, Table 1 of Declaration B also shows impact properties. From Tables 1 and 2 of Declaration A as well as Table 1 of Declaration B, it may be seen that there is no statistical difference between the impact properties of a polycarbonate sample that does not contain the flame retardant salt (sample 6 in Table 2) and polycarbonate samples that contain various levels of the salt. Since the impact resistance does not vary with salt content, it can be clearly seen that the use of a concentrate does not improve the impact properties of the polycarbonate sample as maintained by the Examiner. It is further submitted that this lack of an improvement in the impact properties reflects that there is no improvement in dispersion as the result of using a concentrate. Even if there was an improvement in dispersion, it does not appear to manifest itself in measured mechanical properties and the improvement in the haze is solely the result of synergy between the cyclic siloxane and the fire retardant salt. Thus there is no motivation to combine Ogoe '479 with either Umeda, Rosenquist or Mark, since the use of a masterbatch does not improve the impact properties or the dispersion as claimed by the Examiner.

In addition, the Examiner has stated that "adding a cyclic siloxane to the compositions of Ogoe '479 and Ogoe '280 would reduce the melt viscosity of the polymer and facilitate better dispersion of the additives". (Office Action dated 07/27/04, page 4) However, Rosenquist proves that this is inaccurate. A review of Tables 1A, 1B, 1C, 1D, 2A and 2B in Rosenquist clearly shows that this increasing amount of the cyclic siloxane do not always reduce viscosity. For example, Column 5 of Table 1C shows a composition that contains 0.07 wt% of KPFBS and 0.05 wt% of cyclic siloxane while Column 1 of Table 1D shows a composition that contains 0.07 wt% of KPFBS and 0.1 wt% of cyclic siloxane. The melt flow of both compositions is 15.8. Similarly, Column 7 of Table 2A shows a composition that contains 0.09 wt% of KPFBS and 0.05 wt% of cyclic siloxane while Column 3 of Table 2B shows a composition that contains 0.09 wt%

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of KPFBS and 0.1 wt% of cyclic siloxane. Here, the composition containing the larger amount of siloxane has a higher viscosity thereby disproving the Examiner's contention. Thus the Examiner's contention that the cyclic siloxane reduces the viscosity is incorrect.

While there is no decrease in viscosity with increasing cyclic siloxane content, there is a detrimental decrease in the heat distortion temperature as is detailed below. From Table 1 of Declaration B it may further be seen that there is a decrease in the heat distortion temperature (HDT) test and the softening temperature derived from the Vicat test. Such a reduction in softening temperature is detrimental to a flame retardant composition since it is generally desirable to have deformation occur at as high a temperature possible when heated or subjected to a flame. Thus from the above data, it is quite clear that the addition of the cyclic siloxane to the flame retardant polycarbonate composition containing a flame retardant salt does not improve the impact properties or the dispersion, but instead causes a decrease in the softening temperature of the composition which is generally undesirable. Thus once again, there is no motivation to combine Ogoe '479 with Umeda, Rosenquist or Mark, since there is no advantageous change in viscosity to facilitate an improved dispersion, but rather there is a detrimental effect on the high temperature properties of the fire retardant polycarbonate composition.

The Applicants contend that the Examiner has combined Umeda, Mark, Rosenquist and Ogoe '479 only as a result of hindsight provided by the claims of the present application. In this regard the courts have stated that "[t]he references, when viewed by themselves and not in retrospect, must suggest the invention". *In Re Skoll*, 187 U.S.P.Q. 481 (C.C.P.A. 1975). Applicants further maintain that the Examiner has improperly used Applicants disclosure to select portions of the cited references to allegedly arrive at Applicants invention. In doing so, the Examiner has failed to consider the teachings of the references or Applicants invention as a whole in contravention of §103, including the disclosures of the references that teach away from Applicants invention.

In conclusion, since Umeda, Rosenquist and Mark do not teach all of the claimed elements and since there is no motivation to combine the aforementioned references with Ogoe '280 and Ogoe '479, the Applicants contend that the Examiner has not made a *prima facie* case of obviousness over Umeda, Rosenquist, Mark, Ogoe '479 or Ogoe

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'280. Additionally, since the KPFBS belongs to the same family of fire retardant salts as those claimed in the present application, Applicants believe that they should behave in the same manner.

Thus the Examiner's rejections of Claims 1 - 9 and 21- 29 should be reversed and Claims 1 - 9 and 21- 29 should be allowed.

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VIII. CLAIMS APPENDIX**APPENDIX A**

1. (Previously Presented) A method for reducing haze in fire resistant polycarbonate compositions, comprising:

blending flame retardant salt with a first polycarbonate to produce a concentrate, wherein the flame retardant salt is selected from the group consisting of potassium perfluoromethylbutane sulphonate, potassium perfluoromethane sulphonate, potassium perfluoroethane sulphonate, potassium perfluoropropane sulphonate, potassium perfluorohexane sulphonate, potassium perfluoroheptane sulphonate, potassium perfluorooctane sulphonate, and mixtures comprising at least one of the foregoing flame retardant salts;

pelletizing the concentrate; and,

blending the pelletized concentrate with a second polycarbonate and a cyclic siloxane to form a fire resistant polycarbonate composition.

2. (Original) The method of Claim 1, wherein the flame retardant salt is present in the concentrate in an amount from about 0.10 to about 5.0 weight percent based upon the total weight of the concentrate.

3. (Original) The method of Claim 1, wherein the first polycarbonate is the same as the second polycarbonate.

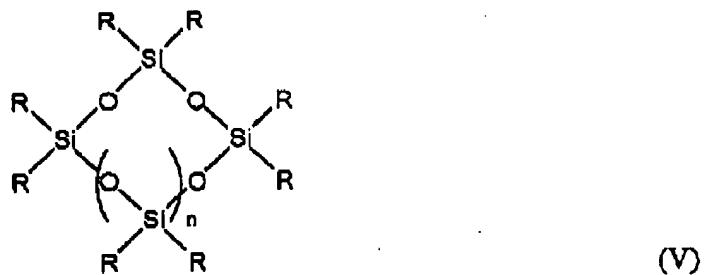
4. (Original) The method of Claim 1, wherein the flame retardant salt is present in the fire resistant polycarbonate composition in amounts of about 0.01 to about 1.0 weight percent based upon the total weight of the polycarbonate.

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5. (Previously Presented) The method of Claim 1, further comprising blending with the concentrate and the second polycarbonate, a filler, a reinforcing agent, a heat stabilizer, an antioxidant, a light stabilizer, a plasticizer, an antistatic agent, a mold releasing agent, an additional resin, a blowing agent or combinations comprising at least one of the foregoing.

6. (Previously Presented) The method of Claim 1, wherein the cyclic siloxane is present in the flame resistant polycarbonate composition in an amount from about 0.01 to about 0.5 parts per hundred parts by weight of the first polycarbonate and the second polycarbonate.

7. (Original) The method of Claim 1, wherein the cyclic siloxane has the general formula (V)



wherein n is 0 - 7 and each R is independently an alkyl group having from 1 to about 36 carbons, an alkoxy group having from 1 to about 36 carbons, a fluorinated or perfluorinated alkyl or alkoxy group having from 1 to about 36 carbons, an arylalkoxy group having from 7 to about 36 carbons, an aryl group having from 6 to about 14 carbons, an aryloxy group having from 6 to about 14 carbons, a fluorinated or perfluorinated aryl group having from 6 to about 14 carbons, or an alkylaryl group having from 7 to about 36 carbons.

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8. (Original) The method of Claim 1, wherein the cyclic siloxane is octaphenylcyclotetrasiloxane, hexamethylcyclotrisiloxane, octamethylcyclotetrasiloxane, decamethylcyclopentasiloxane, dodecamethylcyclohexasiloxane, trimethyltriphenylcyclotrisiloxane, or tetramethyltetraphenylcyclotetrasiloxane.

9. (Original) The method of Claim 1, wherein the cyclic siloxane comprises octaphenylcyclotetrasiloxane.

10. (Original) A method for reducing haze in fire resistant polycarbonate compositions, comprising:

blending flame retardant salt with a first polycarbonate to produce a concentrate, wherein the flame retardant salt comprises a C₁-C₆ alkylammonium salt;

pelletizing the concentrate; and,

blending the pelletized concentrate with a second polycarbonate and a cyclic siloxane to form a fire resistant polycarbonate composition.

11. (Previously Presented) The method of Claim 10, wherein the flame retardant salt is selected from the group consisting of tetrabutyl ammonium perfluoromethylbutane sulphonate, tetrabutyl ammonium perfluoromethane sulphonate, tetrabutyl ammonium perfluoroethane sulphonate, tetrabutyl ammonium perfluoropropane sulphonate, tetrabutyl ammonium perfluorohexane sulphonate, tetrabutyl ammonium perfluoroheptane sulphonate, tetrabutyl ammonium perfluorooctane sulphonate, tetrabutyl ammonium perfluorobutane sulphonate, tetrabutyl ammonium diphenylsulfone sulphonate, and mixtures comprising at least one of the foregoing flame retardant salts.

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12. (Previously Presented) The method of Claim 10, wherein the flame retardant salt is selected from the group consisting of tetraethyl ammonium perfluoromethylbutane sulphonate, tetraethyl ammonium perfluoromethane sulphonate, tetraethyl ammonium perfluoroethane sulphonate, tetraethyl ammonium perfluoropropane sulphonate, tetraethyl ammonium perfluorohexane sulphonate, tetraethyl ammonium perfluoroheptane sulphonate, tetraethyl ammonium perfluorooctane sulphonate, tetraethyl ammonium perfluorobutane sulphonate, tetraethyl ammonium diphenylsulfone sulphonate, and mixtures comprising at least one of the foregoing flame retardant salts.

13. (Original) The method of Claim 10, wherein the flame retardant salt is present in the concentrate in an amount from about 0.10 to about 5.0 weight percent based upon the total weight of the concentrate.

14. (Original) The method of Claim 10, wherein the first polycarbonate is the same as the second polycarbonate.

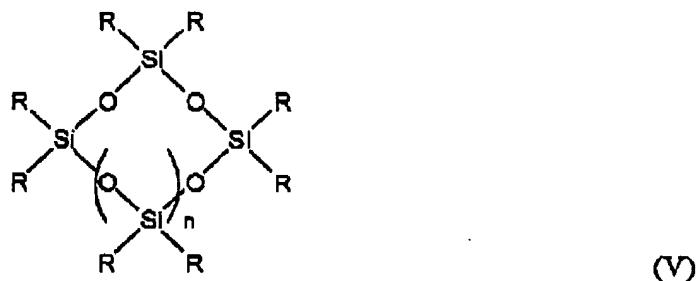
15. (Original) The method of Claim 10, wherein the flame retardant salt is present in the fire resistant polycarbonate composition in amounts of about 0.01 to about 1.0 weight percent based upon the total weight of the polycarbonate.

16. (Previously Presented) The method of Claim 10, further comprising blending with the concentrate and the second polycarbonate, a filler, a reinforcing agent, a heat stabilizer, an antioxidant, a light stabilizer, a plasticizer, an antistatic agent, a mold releasing agent, an additional resin, a blowing agent or combinations comprising at least one of the foregoing.

17. (Previously Presented) The method of Claim 10, wherein the cyclic siloxane is present in the flame resistant polycarbonate composition in an amount from about 0.01 to about 0.5 parts per hundred parts by weight of the first polycarbonate and the second polycarbonate.

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18. (Original) The method of Claim 10, wherein the cyclic siloxane has the general formula (V)



wherein n is 0 - 7 and each R is independently an alkyl group having from 1 to about 36 carbons, an alkoxy group having from 1 to about 36 carbons, a fluorinated or perfluorinated alkyl or alkoxy group having from 1 to about 36 carbons, an arylalkoxy group having from 7 to about 36 carbons, an aryl group having from 6 to about 14 carbons, an aryloxy group having from 6 to about 14 carbons, a fluorinated or perfluorinated aryl group having from 6 to about 14 carbons, or an alkylaryl group having from 7 to about 36 carbons.

19. (Original) The method of Claim 10, wherein the cyclic siloxane is octaphenylcyclotetrasiloxane, hexamethylcyclotrisiloxane, octamethylcyclotetrasiloxane, decamethylcyclopentasiloxane, dodecamethylcyclohexasiloxane, trimethyltriphenylcyclotrisiloxane, or tetramethyltetraphenylcyclotetrasiloxane.

20. (Original) The method of Claim 10, wherein the cyclic siloxane comprises octaphenylcyclotetrasiloxane.

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21. (Previously Presented) A method for reducing haze in fire resistant polycarbonate compositions, comprising:

blending flame retardant salt with a first polycarbonate to produce a concentrate, wherein the flame retardant salt is selected from the group consisting of sodium perfluoromethylbutane sulphonate, sodium perfluoromethane sulphonate, sodium perfluoroethane sulphonate, sodium perfluoropropane sulphonate, sodium perfluorohexane sulphonate, sodium perfluoroheptane sulphonate, sodium perfluorooctane sulphonate, sodium perfluorobutane sulphonate, and mixtures comprising at least one of the foregoing flame retardant salts;

pelletizing the concentrate; and,

blending the pelletized concentrate with a second polycarbonate and a cyclic siloxane to form a fire resistant polycarbonate composition.

22. (Original) A method for reducing haze in fire resistant polycarbonate compositions, comprising:

blending flame retardant salt with a first polycarbonate to produce a concentrate,

pelletizing the concentrate; and

blending the pelletized concentrate with a second polycarbonate and a cyclic siloxane to form a fire resistant polycarbonate composition;

wherein a 4.5 mm thick chip formed from the fire resistant polycarbonate has a percent haze of 0.51 to 1.23.

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23. (Previously Presented) A method for reducing haze in fire resistant polycarbonate compositions, comprising:

blending flame retardant salt with a first polycarbonate to produce a concentrate, wherein the flame retardant salt is selected from the group consisting of potassium diphenylsulphone sulphonate, sodium diphenylsulphone sulphonate, and mixtures comprising at least one of the foregoing flame retardant salts;

pelletizing the concentrate; and,

blending the pelletized concentrate with a second polycarbonate and a cyclic siloxane to form a fire resistant polycarbonate composition.

24. (Previously Presented) A method for reducing haze in fire resistant polycarbonate compositions, comprising:

blending a flame retardant salt with a first polycarbonate to form a concentrate; and

blending the concentrate with a second polycarbonate and a cyclic siloxane to form a fire resistant polycarbonate composition.

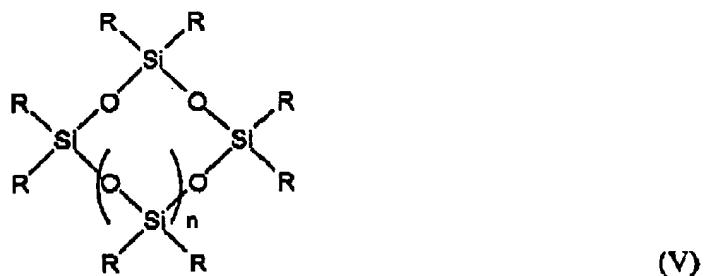
25. (Previously Presented) The method of Claim 24, wherein the first polycarbonate is the same as the second polycarbonate.

26. (Previously Presented) The method of Claim 24, wherein the flame retardant salt is present in the fire resistant polycarbonate composition in amounts of about 0.01 to about 1.0 weight percent based upon the total weight of the first polycarbonate and the second polycarbonate.

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27. (Previously Presented) The method of Claim 24, wherein the cyclic siloxane is present in the flame resistant polycarbonate composition in an amount from about 0.01 to about 0.5 parts per hundred parts by weight of the first polycarbonate and the second polycarbonate.

28. (Previously Presented) The method of Claim 24, wherein the cyclic siloxane has the general formula (V)



wherein n is 0 – 7 and each R is independently an alkyl group having from 1 to about 36 carbons, an alkoxy group having from 1 to about 36 carbons, a fluorinated or perfluorinated alkyl or alkoxy group having from 1 to about 36 carbons, an arylalkoxy group having from 7 to about 36 carbons, an aryl group having from 6 to about 14 carbons, an aryloxy group having from 6 to about 14 carbons, a fluorinated or perfluorinated aryl group having from 6 to about 14 carbons, or an alkylaryl group having from 7 to about 36 carbons.

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29. (Previously Presented) The method of Claim 24, wherein the flame retardant salt is selected from the group consisting of potassium perfluoromethylbutane sulphonate, potassium perfluoromethane sulphonate, potassium perfluoroethane sulphonate, potassium perfluoropropane sulphonate, potassium perfluorohexane sulphonate, potassium perfluoroheptane sulphonate, potassium perfluoroctane sulphonate, sodium perfluoromethylbutane sulphonate, sodium perfluoromethane sulphonate, sodium perfluoroethane sulphonate, sodium perfluoropropane sulphonate, sodium perfluorohexane sulphonate, sodium perfluoroheptane sulphonate, sodium perfluoroctane sulphonate, sodium perfluorobutane sulphonate, tetraethyl ammonium perfluoromethylbutane sulphonate, tetraethyl ammonium perfluoroethane sulphonate, tetraethyl ammonium perfluoropropane sulphonate, tetraethyl ammonium perfluorohexane sulphonate, tetraethyl ammonium perfluoroheptane sulphonate, tetraethyl ammonium perfluoroctane sulphonate, tetraethyl ammonium perfluorobutane sulphonate, tetraethyl ammonium diphenylsulfone sulphonate, tetrabutyl ammonium perfluoromethylbutane sulphonate, tetrabutyl ammonium perfluoroethane sulphonate, tetrabutyl ammonium perfluoropropane sulphonate, tetrabutyl ammonium perfluorohexane sulphonate, tetrabutyl ammonium perfluoroheptane sulphonate, tetrabutyl ammonium perfluoroctane sulphonate, tetrabutyl ammonium perfluorobutane sulphonate, tetrabutyl ammonium diphenylsulfone sulphonate, and mixtures comprising at least one of the foregoing flame retardant salts.

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IX. EVIDENCE APPENDIX

Three declarations (attached hereto as Appendix B, C and D respectively) are submitted pursuant to section 1.132 of this title in connection with this appeal brief.

X. RELATED PROCEEDINGS APPENDIX

There have been no related proceedings in connection with this appeal brief. As a result there are no decisions rendered by a court or the Board pursuant to paragraph (c)(1)(ii) of this section.

XI. CONCLUSION

In summary, Claims 1- 9 and 21 - 29 are non-obvious over the art of record. For the reasons cited above, Appellants respectfully submit that all of the claims are allowable and the application is in condition for allowance. Appellants respectfully request reversal of the outstanding rejections and allowance of this application.

In the event the Examiner has any queries regarding the submitted arguments, the undersigned respectfully requests the courtesy of a telephone conference to discuss any matters in need of attention.

If there are any additional charges with respect to this Appeal Brief, please charge them to Deposit Account No. 07-0893.

Respectfully submitted,

CANTOR COLBURN LLP

By _____

David E. Rodrigues
Registration No. 50,604

Date: April 10, 2006
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APPENDIX B

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APR 10 2006

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Eric Thomas Gohr et al.)
Serial No.: 09/740,074) Group Art Unit: 1714
Filed: July 27, 2004)
For: METHOD FOR REDUCING HAZE IN A)
FIRE RESISTANT POLYCARBONATE)
COMPOSITION) Examiner:
) Szekely, Peter A.

DECLARATION PURSUANT TO 37 C.F.R. § 1.132

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

I, Rajendra K. Singh, declare and state:

1. My educational background includes a B.S. in Chemistry from Bombay University, India, Masters of Science in Organic Polymer Chemistry from Virginia Commonwealth University and a Ph.D. in Chemistry from the University of Missouri-Rolla in Organic Polymer Chemistry.
2. I have been employed by the General Electric Company since October 1998, where I am currently a Product Engineer in the High Performance Polymers Technology Group at General Electric Plastics in Mount Vernon, Indiana.
3. I am an inventor or co-inventor on at least 5 U.S. patents assigned to the General Electric Company relating to plastic compositions, methods, and articles.
4. I am an inventor of the invention claimed in the above-identified application.

APPENDIX B

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GP1-0035-C

5. I am also an inventor on the parent application having U.S. Application Serial No. 09/749,645 filed on December 27, 2000, now U.S. Patent No. 6,730,720, which is hereby incorporated by reference in its entirety.

6. I designed the experiments in the two declarations - Declaration A and Declaration B that are attached to this document. These declarations were submitted in support of our invention during the prosecution of U.S. Application Serial No. 09/749,645 filed on December 27, 2000, now U.S. Patent No. 6,730,720. The experiments listed in the respective declarations were conducted using a polycarbonate, a potassium salt of perfluorobutane sulfonate (KFPBS) and a cyclic siloxane to form a fire retardant composition.

7. The experiments in Declaration A demonstrate that a) impact properties of polycarbonate resin are not degraded or changed in any manner by the addition of the potassium salt of perfluorobutane sulfonate b) the addition of the cyclic siloxane does not improve the impact properties of the composition. This clearly shows that the addition of the flame retardant salt in masterbatch form does not improve the impact properties as claimed by the Examiner.

7. The experiments conducted in Declaration B show that the melt volume rate increases with the increase in the cyclic siloxane content indicating a reduction in viscosity. The HDT test and the Vicat test also show a reduction in the softening temperature with increasing siloxane content. Such a reduction in softening temperature is detrimental to a flame retardant composition since it is generally desirable to have deformation occur at as high a temperature possible when heated or subjected to a flame. Thus from the above data, it is quite clear that the addition of the cyclic siloxane to the flame retardant polycarbonate composition containing a flame retardant salt does not improve the impact properties, but instead causes a decrease in the softening temperature of the composition which is generally undesirable.

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8. The flame retardant salt used in the Declarations A and B is the potassium salt of perfluorobutane sulfonate, which belongs to the same family of salts as those claimed in Claim 1 and Claim 21. It is therefore expected that the salts claimed in Claim 1 and Claim 21 will behave in a manner similar to potassium salt of perfluorobutane sulfonate.

9. I further declare that all statements and representations made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements and representations were made with the knowledge that willful false statements and the like, so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued therefrom.

Oct 25 2004

Dated

Rajendra Kishinath Singh

Rajendra K Singh, Ph.D.

APPENDIX C
DECLARATION A

SCL5989

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APR 10 2006

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Eric Thomas Gohr et al. }
Serial No.: 09/749,645 } Group Art Unit: 1714
Filed: December 27, 2000 }
For: METHOD FOR REDUCING HAZE IN A }
FIRE RESISTANT POLYCARBONATE }
COMPOSITION } Examiner: Szekely, Peter A.

DECLARATION PURSUANT TO 37 C.F.R. § 1.132

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

I, Rajendra K. Singh, declare and state:

1. My educational background includes a B.S. in Chemistry from Bombay University, India, Masters of Science in Organic Polymer Chemistry from Virginia Commonwealth University and a Ph.D. in Organic Polymer Chemistry from the University of Missouri-Rolla in Organic Polymer Chemistry.
2. I have been employed by the General Electric Company since October 1998, where I am currently a Product Engineer in the Lexan Technology Group at General Electric Plastics in Mount Vernon, Indiana.
3. I am an inventor or co-inventor on at least 2 U.S. patents assigned to the General Electric Company relating to plastic compositions, methods, and articles.

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SCL5989

4. I am an inventor of the invention claimed in the above-identified application.

5. I designed and supervised the preparation and testing of six compositions, which are shown in Table 1 and four additional compositions shown in Table 2. The compositions shown in Table 1 comprise polycarbonate resin, a flame retardant salt i.e., potassium salt of perfluorobutane sulfonate (KPFBS) and a cyclic siloxane as shown in Table 1. The compositions shown in Table 2 contain only polycarbonate resin and the flame retardant KPFBS. All the additives to the polycarbonate resin in Tables 1 and 2 are measured in parts per hundred (phr).

6. Five samples of each composition were prepared and tested according to the procedures described in the above-identified application. Samples were tested for Notched Izod impact strength as per ASTM D 256. The results of the tests have been averaged and are reported in Table 1 and Table 2.

Table 1

	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
KPFBS (phr)	0.05	0.05	0.1	0.1	0.05	—
Siloxane (phr)	0.1	0.2	—	0.2	0.1	0.1
Notched Izod (ft-lb/inch)	15.694	15.873	15.427	15.492	15.578	15.419
Standard Deviation	1.141	0.646	0.705	1.301	0.558	0.992

7. As can be seen in Table 1, there is no observable trend in the impact strength, with either the mere presence or an increase in the amount of cyclic siloxane. For example, Samples 1, 2 and 5, all possess 0.05 phr of the flame retardant salt, while

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Samples 1 and 3 possess cyclic siloxane in an amount of 0.1 phr, and Sample 2 possesses the cyclic siloxane in an amount of 0.2 phr respectively. The impact strength increases only slightly from approximately 15.69 and 15.57 ft-lbs/inch for Samples 1 and 5 respectively to 15.87 ft-lbs/inch for Sample 2, which is within the limits of statistical variation when the standard deviations shown in Table 1 is taken into account. Similarly, Sample 3, which contains only 0.1 phr of the flame retardant salt may be compared with Sample 4 (which contains 0.1 phr of the flame retardant salt and 0.2 phr of the cyclic siloxane) and Sample 6, which contains 0.1 phr of the cyclic siloxane. From the impact strength results it can be seen that there is practically no variation in the impact strength results for Samples 3, 4 or 6. All the impact strength results are within the limits of statistical variation. This clearly shows that the addition of the flame retardant salt does not degrade impact strength in as much as the cyclic siloxane does not improve impact strength as claimed by the Examiner.

Table 2

	Sample 7	Sample 8	Sample 9	Sample 10	Sample 11
KPFBS (phr)	0.0	0.05	0.08	0.09	0.1
Notched Izod (ft-lb/inch)	15.060	15.093	13.674	15.48	16.13
Standard Deviation	0.441	0.677	0.629	1.027	0.976

8. The experiments shown in Table 2, were further conducted to prove that the addition of only the flame retardant salt to the polycarbonate resin does not in any way alter the impact properties of the polycarbonate resin. From the table it may be seen that increasing the quantity of the flame retardant salt from 0.0 to 0.1 phr does not reduce

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DECLARATION A

SCL5989

the impact properties of the polycarbonate resin. Sample 7, which does not contain any flame retardant salt has an impact strength of 15.060 ft-lbs/inch. Sample 9 does show slightly lower results, but this may be considered an outlier, since all the other samples have impact strength above 15 ft-lbs/inch. Thus, once again it can be clearly seen that the addition of the flame retardant salt to the polycarbonate resin does not degrade the impact strength and therefore the cyclic siloxane does not have to be added to improve the impact properties of the polycarbonate resin as maintained by the Examiner.

9. I further declare that all statements and representations made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements and representations were made with the knowledge that willful false statements and the like, so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued therefrom.

Dec 31'02

Dated

Rajendra K Singh
Rajendra K Singh, Ph.D.

APPENDIX D
DECLARATION B8CL5989
(GP1-0035)RECEIVED
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APR 10 2006

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Eric Thomas Gehr et al.)
Serial No.: 09/749,645) Group Art Unit: 1714
Filed: December 27, 2000)
For: METHOD FOR REDUCING HAZE IN A)
FIRE RESISTANT POLYCARBONATE)
COMPOSITION) Examiner: Szekely, Peter A.

DECLARATION PURSUANT TO 37 C.F.R. § 1.132

Box AF
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

I, Rajendra K. Singh, declare and state:

1. My educational background includes a B.S. in Chemistry from Bombay University, India, Masters of Science in Organic Polymer Chemistry from Virginia Commonwealth University and a Ph.D. in Chemistry from the University of Missouri-Rolla in Organic Polymer Chemistry.

2. I have been employed by the General Electric Company since October 1998, where I am currently a Product Engineer in the Lexan Technology Group at General Electric Plastics in Mount Vernon, Indiana.

3. I am an inventor or co-inventor on at least 2 U.S. patents assigned to the General Electric Company relating to plastic compositions, methods, and articles.

APPENDIX D
DECLARATION BSCL5989
(GP1-0035)

4. I am an inventor of the invention claimed in the above-identified application.

5. I designed and supervised the preparation and testing of six compositions, which are shown in Table 1. The compositions comprise polycarbonate resin, 0.08 parts per hundred (phr) of the flame retardant salt potassium salt of perfluorobutane sulfonate (KPFBS) and a variable amount of cyclic siloxane from 0.05 to 2 phr based on total weight of the composition as shown in Table 1.

6. Five samples of each composition were prepared and tested according to the procedures described in the above-identified application. Samples were subjected to tensile testing as per ASTM D 638-99 to determine the modulus, maximum stress at yield and break, and elongation at yield and break. Samples were tested for Notched Izod impact strength as per ASTM D 256. Flexural Modulus and flexural strength were measured as per ASTM D 790. Heat distortion temperature (HDT) was measured as per ASTM D 648. The results of the tests have been averaged and are reported in Table 1.

7. As can be seen in Table 1, almost all mechanical properties such as the flexural modulus, secant modulus, flexural strength, flex stress at 5% strain, impact strength, ductility, impact energy, ratio of energy to maximum load, and tensile properties show virtually no change with the increase in the amount of cyclic siloxane. The average values for all of these mechanical properties are almost identical within the limits of statistical variation, irrespective of the amount of cyclic siloxane. Further there is no observable trend in the mechanical properties, especially in the impact strength, with the increase in the amount of cyclic siloxane.

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(GP1-0035)

8. The only properties that show any trends that are dependent upon the amount of cyclic siloxane are the melt volume rate at 18 minutes and 6 minutes as well as the heat distortion temperature (HDT) test and the softening temperature derived from the Vicat test (ASTM D 1525). While the melt volume rate increases with the increase in cyclic siloxane content indicating a reduction in viscosity, it can clearly be seen that the HDT test and the Vicat test show a reduction in the softening temperature with increasing siloxane content. Such a reduction in softening temperature is detrimental to a flame retardant composition since it is generally desirable to have deformation occur at as high a temperature possible when heated or subjected to a flame. Thus from the above data, it is quite clear that the addition of the cyclic siloxane to the flame retardant polycarbonate composition containing a flame retardant salt does not improve the impact properties, but instead causes a decrease in the softening temperature of the composition which is generally undesirable.

9. I further declare that all statements and representations made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements and representations were made with the knowledge that willful false statements and the like, so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued therefrom.

ACT 24 2002
Dated

Rajendra Kothiyal Singh
Rajendra K. Singh, Ph.D.

APPENDIX D
DECLARATION B

TABLE I

	1	2	3	4	5	6
Sample No.	0.08	0.08	0.08	0.08	0.08	0.08
FR Salt Loading (phr)	0.05	0.1	0.25	0.5	1	2
Cyclic Siloxane Loading (phr)						
Properties	Units	1	2	3	4	5
Melt Volume Rate@18 min.	cm ³ /10 min	11.68	13.17	13.19	14.59	15.26
Melt Volume Rate@6 min.	cm ³ /10 min	11.32	12.68	12.76	13.8	14.88
Melt Volume Rate@6 min.	PSI	337000	343000	359000	344000	343000
Flexural Modulus	PSI	325000	327000	324000	329000	327000
Secant Modulus@2% Strain	PSI	14600	14500	14500	14600	14400
Flexural Strength	PSI	13100	13000	13000	13100	13000
Flex. Stress@5% Strain	°C	127.4	126	126.9	125.2	124.7
HTT Temperature	%	100	100	100	100	100
Ductility	lb/in	16.463	16.004	16.463	15.745	15.837
Impact Strength	%	100	100	100	100	100
Ductility	ft/s	11.72	11.72	11.72	11.73	11.72
Drop Velocity	ft/lbf	106.8	106.8	106.8	106.9	106.8
Impact Energy	ft-lbf	52.2	52.4	52.5	53.3	54
Energy to Max. Load	R-lbf	56.2	56.6	56.5	57.2	58
Total Energy	Ibf	1580	1610	1610	1610	1610
Max Load	PSI	336000	339000	334000	337000	340000
Tensile Modulus	PSI	8920	8900	8920	8900	8920
Tensile Stress@ Yield	PSI	920	10300	10100	9660	10000
Tensile Stress@Break	%	6.36	6.2	6.28	6.3	6.22
Tensile Elongation@Yield	%	126.42	134.52	142.1	144.18	147.22
Tensile Elongation@Break	%	126.42	134.52	142.1	144.18	147.22
Cdr. Specimen Thickness (125 mils)	μ[FTP]	0.9935	0.9558	0.967	0.9406	0.9036
Visc Temperature	°C	142.9	142.5	142.8	141.9	141.5
Yellowness Index	%	90.2	90.7	90.8	90.8	90.5
Transmission	%	1.5	1	0.8	0.8	1.2
Haze	%					